

WHAT IS CLAIMED IS:

1. An echo canceler receiving a transmit signal and a receive signal, the transmit signal including an echo of the receive signal, comprising:

a signal level data generator detecting activity of the transmit signal and the receive signal, generating signal level data for the transmit signal, and updating the signal level data when the transmit signal is active and the receive signal is inactive;

an echo cancellation signal generator detecting activity of the transmit signal and the receive signal, generating an echo cancellation signal from the receive signal by use of coefficients, and updating the coefficients when the transmit signal is inactive and the receive signal is active;

a first automatic gain control unit coupled to the echo cancellation signal generator, amplifying the echo cancellation signal according to the signal level data, thereby generating an amplified echo cancellation signal;

a second automatic gain control unit coupled to the signal level data generator, amplifying the transmit signal according to the signal level data, thereby generating an amplified transmit signal; and

an arithmetic unit coupled to the first automatic gain control unit and the second automatic gain control unit, subtracting the amplified echo cancellation signal from the amplified transmit signal, thereby generating a transmit output signal for output from the echo canceler.

2. The echo canceler of claim 1, wherein the echo cancellation signal generator and the signal level data generator both use a first criterion to decide whether the transmit signal is active, and a second criterion to decide

whether the receive signal is active.

3. The echo canceler of claim 2, wherein the first criterion is a first minimum input level and the second criterion is a second minimum input level.

4. The echo canceler of claim 3, wherein the transmit signal has a transmit signal level, the receive signal has a receive signal level, and the echo cancellation signal generator and the signal level data generator recognize the transmit signal as active when the transmit signal level is at least equal to the first minimum input level, recognize the transmit signal as inactive when the transmit signal level is less than the first minimum input level, recognize the receive signal as active when the receive signal level is at least equal to the second minimum input level, and recognize the receive signal as inactive when the receive signal level is less than the second minimum input level.

5. The echo canceler of claim 1, wherein the first automatic gain control unit and the second automatic gain control unit operate with mutually identical gain.

6. An echo canceler receiving a transmit signal and a receive signal, the transmit signal including an echo of the receive signal, comprising:

a signal level data generator generating signal level data for the transmit signal;

an echo cancellation signal generator generating an echo cancellation signal from the receive signal;

a first automatic gain control unit coupled to the echo cancellation signal generator, amplifying the echo cancellation signal according to the signal level data, thereby generating an amplified echo cancellation signal;

a second automatic gain control unit coupled to the signal level data generator, amplifying the transmit signal according to the signal level data, thereby generating an amplified transmit signal; and

an arithmetic unit coupled to the first automatic gain control unit and the second automatic gain control unit, subtracting the amplified echo cancellation signal from the amplified transmit signal, thereby generating a transmit output signal for output from the echo canceler.

7. An echo canceler receiving a transmit signal and a receive signal, the transmit signal including an echo of the receive signal, comprising:

a signal level data generator detecting input levels of the transmit signal and the receive signal, generating signal level data for the transmit signal, selecting update times according to the input levels of both the transmit signal and the receive signal, and updating the signal level data at the selected update times;

an echo cancellation signal generator generating an echo cancellation signal from the receive signal;

an automatic gain control unit coupled to the signal level data generator, amplifying the transmit signal according to the signal level data, thereby generating an amplified transmit signal; and

an arithmetic unit coupled to the echo cancellation signal generator and the automatic gain control unit, subtracting the echo cancellation signal from the amplified transmit signal, thereby generating a transmit output signal for output from the echo canceler.

8. The echo canceler of claim 7, wherein the signal level data generator uses a first minimum input level and a second minimum input level as selection criteria and selects, as

said update times, times when the transmit signal has an input level at least equal to the first minimum input level, and the receive signal simultaneously has an input level less than the second minimum input level.

9. A method of canceling an echo of a receive signal in a transmit signal while controlling a signal level of the transmit signal, comprising the steps of:

(a) detecting activity of the transmit signal and the receive signal;

(b) generating signal level data for the transmit signal;

(c) updating the signal level data when the transmit signal is active and the receive signal is inactive, the signal level data being left unchanged when the receive signal is active;

(d) generating an echo cancellation signal from the receive signal;

(e) amplifying the echo cancellation signal according to the signal level data, thereby generating an amplified echo cancellation signal;

(f) amplifying the transmit signal according to the signal level data, thereby generating an amplified transmit signal; and

(g) subtracting the amplified echo cancellation signal from the amplified transmit signal, thereby generating a transmit output signal.

10. The method of claim 9, wherein said step (d) is carried out by use of coefficients, further comprising the step of:

updating the coefficients when the transmit signal is inactive and the receive signal is active.

11. The method of claim 9, wherein said step (a) further

comprises the steps of:

comparing the transmit signal with a first minimum input level; and

comparing the receive signal with a second minimum input level.

12. The method of claim 9, wherein said step (f) and said step (g) employ identical gain factors.

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